

RECEIVED  
CENTRAL FAX CENTER

SEP 23 2004

Docket No.: 22122878-4412

**IN THE UNITED PATENT AND TRADEMARK OFFICE**

Applicants: Anthony C. Zuppero et al.  
Application No.: 09/631,463  
U.S. Filing Date: August 3, 2000  
Title: SOLID STATE SURFACE CATALYSIS REACTOR  
Group Art Unit: 1725  
Examiner: Kiley Stoner

---

Assistant Commissioner for Patents  
Washington, D.C. 20231

**INFORMATION DISCLOSURE STATEMENT****S I R:**

1. In accordance with the duty of disclosure under 37 C.F.R. § 1.56 and in conformance with the procedures of 37 C.F.R. §§ 1.97 and 1.98 and M.P.E.P. § 609, attorneys for Applicants hereby bring the following references, which are listed on the attached modified PTO Form No. 1449 to the attention of the Examiner. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

---

**CERTIFICATE OF TRANSMISSION**

I hereby certify that this correspondence is being facsimile transmitted to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, Group Art Unit 1753 at (703) 872-9306 on September 23, 2004.

  
\_\_\_\_\_  
Esther Kim

NYCDMS/429245.1

BEST AVAILABLE COPY

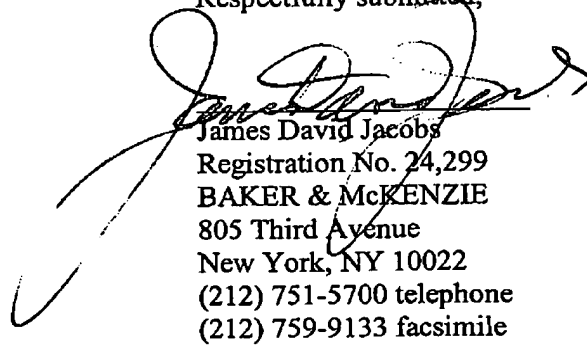
Docket No.: 22122878-4412

2. Applicants respectfully request that the following co-owned patents and co-pending applications be considered and made of record in the present application:  
US Patent Nos. 6,114,620 (cited on PTO-892 by the Examiner); 6,218,608 (cited on PTO-892 by the Examiner); 6,222,116 (cited on PTO-892 by the Examiner); 6,268,560 (cited on PTO-892 by the Examiner); 6,327,859 (cited on PTO-892 by the Examiner); 6,700,056 (cited on PTO-892 by the Examiner); 6,678,305; 6,649,823 (cited on PTO-892 by the Examiner); and  
US Patent Application Nos. 10/759,341; 09/631,463; 09/682,363 (US-2002/0017827, cited on form PTO-892 by the Examiner); 10/052,004 (US-2003/0166307, cited on form PTO-892 by the Examiner); 10/625,801; 10/185,086 (US-2003/0000570, cited on PTO-892 by the Examiner).  
The references cited in each of those patents and applications are listed on Form 1449 accompanying this information disclosure statement.
3. Copies of the references listed on the modified PTO form 1449 will follow under a separate cover by first class mail due to their volume.

Docket No.: 22122878-4412

4. No fee is deemed necessary with the filing of these documents. If a fee is deemed necessary, we authorize the Commissioner of Patents and Trademarks to charge Deposit Account No.: 02-0393.

Respectfully submitted,



James David Jacobs  
Registration No. 24,299  
BAKER & MCKENZIE  
805 Third Avenue  
New York, NY 10022  
(212) 751-5700 telephone  
(212) 759-9133 facsimile

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Substitute for form 1449/PTO</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>	<b>Complete if Known</b>	
	Application Number	09/631,463
	Filing Date	August 3, 2000
	First Named Inventor	Anthony C. Zuppero
	Art Unit	1725
	Examiner Name	Kiley Stoner
Sheet 1 of 57	Attorney Docket Number	22122878-4412

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	1	US- 6114620A	09-2000	Zuppero et al.	
	2	US- 4753579	06-1988	Murphy	
	3	US- 5525041	06-1996	Deak	
	4	US- 5299422	04-1994	Nakagawa et al.	
	5	US- 5317876	05-1994	Nakagawa et al.	
	6	US- 4045359	08-1997	Fletcher et al.	
	7	US- 4407705	10-1983	Garscadden et al.	
	8	US- 5593509	01-1997	Zuppero et al.	
	9	US- 5641585	06-1997	Lessing et al.	
	10	US- 6114620	09-2000	Zuppero et al.	
	11	US- 6218608	04-1001	Zuppero et al.	
	12	US- 6222116	04-2001	Zuppero et al.	
	13	US- 6268560	07-2001	Zuppero et al.	
	14	US- 2001-0018923 A1	09-2001	Zuppero et al.	
	15	US- 6327859 B1	12-2001	Zuppero et al.	
	16	US- 6649823 B2	11-2003	Zuppero et al.	
	17	US- 6678305 B1	01-2004	Zuppero et al.	
	18	US- 6700056 B2	03-2004	Zuppero et al.	
	19	US- 20020017827 A1	02-2002	Zuppero et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials <sup>4</sup>	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>3</sup>
		Country Code <sup>5</sup> -Number <sup>4</sup> -Kind Code <sup>2</sup> (if known)				

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PTO/SB/08A (08-03)

Approved for use through 07/31/2008. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 2 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**U. S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	20	US- 20030166307 A1	09-2003	Zuppero et al.	
	21	US- 20030000570 A1	01-2003	Zuppero et al.	
	23	US- 20020196825 A1	12-2002	Zuppero et al.	
	24	US- 6678305	01-2004	Zuppero et al.	
	25	US- 20020070632	06-2002	Zuppero et al.	
	26	US- 4651324	03-1987	Prein et al.	
	27	US- 5337329	08-1994	Foster, Jack	
	28	US- 4756000	07-1988	Macken, John A.	
	29	US- 5999547	12-1999	Schneider et al.	
	30	US- 5048042	09-1991	Moser et al.	
	31	US- 6268560	07-2001	Zueppero et al.	
	32	US- 5587827	12-1996	Hakimi et al.	
	33	US- 6114620	09-2000	Zuppero et al.	
	34	US- 4012301	03-1977	Rich et al.	
	35	US- 5470395	11-1995	Yater et al.	
	36	US-			
		US-			
		US-			
		US-			

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>5</sup>
		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				

Examiner  
SignatureDate  
Considered

\*EXAMINER: initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.



Sheet 4 of 57

<b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>  (Use several sheets if necessary)	Attorney Docket Number 22122878-4412	Application Number 09/631,463
	Applicants Anthony C. Zuppero et al.	
	Filing Date August 3, 2000	Group Art Unit 1725

**U.S. PATENT DOCUMENTS**

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE

**FOREIGN PATENT DOCUMENTS**

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent Pages, etc.)

	"Electron-hole pair creation by reactions at metal surfaces", downloaded from <a href="http://www.aps.org/meet/CENT99/BAPS/abs?S6980001.html">www.aps.org/meet/CENT99/BAPS/abs?S6980001.html</a> American Physical Society Centennial Meeting Program, Atlanta, GA. 20-26 March 1999
	"Electron-Hole Pair Creation at Ag and Cu Surfaces by Adsorption of Atomic Hydrogen and Deuterium", Physical Review Letters, Volume 82, Number 2. 11 January 1999
EXAMINER:	DATE CONSIDERED:
EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.	

Computer-Generated Form PTO-1449 (Rev 2-92)

[NYC]:41763.1

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 9551-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 5 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppers
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	21222878-4412

## U.S. PATENT DOCUMENTS

[illegible]

## FOREIGN PATENT DOCUMENTS

[illegible]

**Examiner  
Signature**

Date Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Documents of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 90-.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**



PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**(Use as many sheets as necessary)**

Sheet 6 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppers
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	21222878-4412

## U.S. PATENT DOCUMENTS

[illegible]

**FOREIGN PATENT DOCUMENTS**

[illegible]

**Examiner  
Signature**

Date Considered

**\*EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 201.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

**Estimated Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**

PTO/SB/089 (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 1 of 57

**OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	2	HARRISON, P. et al., The Carrier Dynamics of Far-Infrared Intersubband Lasers and Tunable Emitters, Institute of Microwaves and Photonics, University of Leeds, U.K., pp. 1-64	
	3	WEBER, et al., to X2 Electron Transfer Times in Type-II GaAs/AlAs Superlattices Due to Emission of Confined and Interface Phonons, Superlattices and Microstructures, Vol. 23, No. 2 (1998).	
	4	FANN, W.S. et al., Electron Thermalization in Gold, Physical Review B, Brief Reports, Vol. 46, No. 20, (1992)	
	5	Ultrafast Surface Dynamics Group, Time-Resolved Two-Photon Photoemission (TR-2PPE), <a href="http://www.ilp.physik.uni-essen.de/aeschlimann/2y_photo.htm">http://www.ilp.physik.uni-essen.de/aeschlimann/2y_photo.htm</a>	
	6	LEWIS et al., Vibrational Dynamics of Molecular Overlayers on Metal Surfaces, Dept. of Chemistry, University of Pennsylvania, <a href="http://lorax.chem.upenn.edu/molisurf/cucotalk/html">http://lorax.chem.upenn.edu/molisurf/cucotalk/html</a> .	
	7	RETTNER et al., Dynamics of the Chemisorption of O <sub>2</sub> on Pt(111): Dissociation via Direct Population of a Molecularly Chemisorbed Precursor at High Incidence Kinetic Energy, The Journal of Chemical Physics, Vol. 94, Issue 2 (1991).	
	8	FRIEDMAN et al., SiGe/Si THz Laser Based on Transitions Between Inverted Mass Light-Hole and Heavy Hole Standards, Applied Physics Letters, Vol. 78, No. 4 (2001).	
	9	HARRISON et al., Population Inversion and Gain Estimates for a Semiconductor TASER	
	10	HARRISON et al., Theoretical Studies of Subband Carrier Lifetimes in an Optically Pumped Three-Level-Terahertz Laser, Superlattices and Microstructures, Vol. 23, No. 2 (1998)	
	11	HARRISON et al., Room Temperature Population Inversion in SiGe TASER Designs, IMP, School of Electronic and Electrical Engineering, The University of Leeds	
	12	SUN et al., Phonon-Pumped Terahertz Gain in n-Type GaAs/AlGaAs Superlattices, Applied Physics Letters, Vol. 7, No. 22 (2001)	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0651-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 8 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	13	ALTUKHOV et al., Towards Si1-xGe Quantum-Well Resonant-State Terahertz Laser, Applied Physics Letters, Vol. 79, No. 24 (2001)	
	14	SUN et al., Intersubband Lasing Lifetimes of SiGe/Si and GaAs/AlGaAs Multiple Quantum Well Structures, Applied Physics Letters, Vol. 66, No. 25 (1995)	
	15	SUN et al., Phonon Pumped SiGe/Si Interminiband Terahertz Laser	
	16	SOREF et al., Terahertz Gain in a SiGe/Si Quantum Starcase Utilizing the Heavy-Hole Inverted Effective Mass, Applied Physics Letters, Vol. 79, No. 22 (2001)	
	17	AESCHLIMANN et al., Competing Nonradiative Channels for Hot Electron Induced Surface Photochemistry, Chemical Physics 202, 127-141 (1996)	
	18	AUERBACH, Daniel J., Hitting the Surface-Softly, Science, Vol. 294, pp. 2488-2489 (2001)	
	19	BADESCU et al., Energetics and Vibrational States for Hydrogen on Pt(111), Physical Review Letters, Vol. 88, No. 13 (2002)	
	20	BALANDIN et al., Effect of Phonon Confinement on the Thermoelectric Figure of Merit of Quantum Wells, Journal of Applied Physics, Vol. 84, No. 11 (1998)	
	21	BARTELS et al., Coherent Zone-Folded Longitudinal Acoustic Phonons in Semiconductor Superlattices: Excitation and Detection, Physical Review Letters, Vol. 82, No. 5 (1999)	
	22	BAUMBERG et al., Ultrafast Acoustic Phonon Ballistics in Semiconductor Heterostructures, Physical Review Letters, Vol. 78, No. 17 (1997)	
	23	BEDURFTIG et al., Vibrational and Structural Properties of OH Adsorbed on Pt(111), Journal of Chemical Physics, Vol. 111, No. 24 (1999)	

Examiner  
SignatureDate  
Considered

<sup>1</sup> EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 9 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	24	VALDEN et al., Onset of Catalytic Activity of Gold Clusters on Titania with the Appearance of Nonmetallic Properties, Science, Vol. 281 (1998)	
	25	BONDZIE et al., Oxygen Adsorption on Well-Defined Gold Particles on TiO <sub>2</sub> (110), J. Vac. Sci. Technol. A17(4) (1999)	
	26	BEZANT et al., Intersubband Relaxation Lifetimes in p-GaAs/AlGaAs Quantum Wells Below the LO-Phonon Energy Measured in a Free Electron Laser Experiment, Semicond. Sci. Technol. 14 (1999)	
	27	BRAKO et al., Interaction of CO Molecules Adsorbed on Metal Surfaces, Vacuum 61,89-93 (2001)	
	28	BURGI et al., Confinement of Surface State Electrons in Fabry-Perot Resonators, Physical Review Letters, Vol. 81, No. 24 (1998)	
	29	BURGI et al., Probing Hot-Electron Dynamics at Surfaces with a Cold Scanning Tunneling Microscope, Physical Review Letters, Vol. 82, No. 22 (1999)	
	30	CHANG, Y.M., Interaction of Electron and Hole Plasma with Coherent Longitudinal Optical Phonons in GaAs, Applied Physics Letter, Vol. 80, No. 14 (2002)	
	31	CHANG et al., Observation of Coherent Surface Optical Phonon Oscillations by Time-Resolved Surface Second-Harmonic Generation, Physical Review Letters, Vol. 78, No. 24 (1997)	
	32	CHANG et al., Coherent Phonon Spectroscopy of GaAs Surfaces Using Time-Resolved Second-Harmonic Generation, Chemical Physics 251, 283-308 (2000)	
	33	CHANG et al. Observation of Local-Interfacial Optical Phonons at Buried Interfaces Using Time-Resolved Second Harmonic Generation, Physical Review B, Vol. 59, No. 19 (1999)	
	34	CHEN et al., Stimulate-Emission-Induced Enhancement of the Decay Rate of Longitudinal Optical Phonons in III-V Semiconductors; Applied Physics Letters, Vol. 80, No. 16 (2002)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0651-0031  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 10 of 57**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	35	CORCELLI et al., Vibrational Energy Pooling in CO on NaCl(100): Methods, Journal of Chemical Physics, Vol. 116, No. 18 (2002)	
	36	FIERZ et al., Time-Resolved 2-Photon Photoionization on Metallic Nanoparticles, Appl. Phys. B 68 (1999); <a href="http://www.llp.physik.uni-essen.de/aeschlimann/abstract.htm#6">http://www.llp.physik.uni-essen.de/aeschlimann/abstract.htm#6</a>	
	37	BEZANT et al., Intersubband Relaxation Lifetimes in p-GaAs/AlGaAs Quantum Wells Below the LO-Phonon Energy Measured in a Free Electron Laser Experiment, Semicond. Sci. Technol., 14 No. 8 (1999)	
	38	BONDZIE et al., Oxygen Adsorption on Well-Defined Gold Particles on TiO <sub>2</sub> (110), Journal of Vacuum Science & Technology A: Vacuum, Surfaces and Films, Vol. 17, Issue 4, pp. 1717-1720 (1999)	
	39	HARRISON et al., Maximising the Population Inversion, by Optimizing the Depopulation Rate, in Far-Infrared Quantum Cascade Lasers (2001)	
	40	HARRISON et al., The Carrier Dynamics of Terahertz Intersubband Lasers, Some Publishing Company (1999)	
	41	FANN et al., Electron Thermalization in Gold, Physical Review B, Vol. 46, No. 20 (1992)	
	42	CUMMINGS et al., Ultrafast Impulsive Excitation of Coherent Longitudinal Acoustic Phonon Oscillations in Highly Photoexcited InSb, Applied Physics Letters, Vol. 79, No. 6 (2001)	
	43	CHIANG, T.C., Photoemission Studies of Quantum Well States in Thin Films, Surface Science Reports 39, pp. 181-235 (2000)	
	44	DEBERNARDI et al., Anharmonic Phonon Lifetimes in Semiconductors from Density-Functional Perturbation Theory, Physical Review Letters, Vol. 75, No. 9 (1995)	
	45	DAVIS et al., Kinetics and Dynamics of the Dissociative Chemisorption of Oxygen on Ir(111), J. Chem. Phys. 109 (3) (1997)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 11 of 57

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	46	CHOI et al., Ultrafast Carrier Dynamics in a Highly Excited GaN Epilayer, Physical Review B, Vol. 63, 115315 (2001)	
	47	DIEKHONER et al., Parallel Pathways in Methanol Decomposition on Pt(111), Surface Science 409, pp. 384-391 (1998)	
	48	DEMIDENKO et al., Piezoelectrically Active Acoustic Waves Confined in a Quantum Well and Their Amplification by electron Drift, Semiconductor Physics, Quantum Electronics & Optoelectronics, Vol. 3, No. 4, pp. 427-431 (2000)	
	49	de PAULA et al., to X2 Electron Transfer Times in Type-II Superlattices Due to Emission of Confined Phonons, Appl. Phys. Lett. 65 (10) (1994)	
	50	de PAULA et al., Carrier Capture via Confined Phonons in GaAs-AlGaAs Multiple Quantum Wells, Second, Sci. Technol. 9, pp. 730-732 (1994)	
	51	DEMIDENKO et al., Amplification of Localized Acoustic Waves by the Electron Drift in a Quantum Well, Semiconductor Physics, Quantum Electronics & Optoelectronics, Vol. 2, No. 1, pp. 11-24 (1999)	
	52	DEMIDENKO et al., Generation of Coherent Confined Acoustic Phonons by Drifting Electrons in Quantum Wire; Semiconductor Physics, Quantum Electronics & Optoelectronics, Vol. 3, No. 4, pp. 432-437 (2000)	
	53	DENZLER et al., Surface Femtochemistry: Ultrafast Reaction Dynamics Driven by Hot Electron Mediated Reaction Pathways, World Scientific (2001)	
	54	FATTI et al., Temperature-Dependent Electron-lattice Thermalization in GaAs, Physical Review B, Vol. 59, No. 7 (1999)	
	55	ANASTASSAKIS et al., The Physics of Semiconductors, Vol. 2, World Scientific (1990)	
	56	de PAULA et al., Carrier Capture Processes in Semiconductor Superlattices due to Emission of confined Phonons, J. Appl. Phys. 77 (12) (1995)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 12 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	57	ENGSTROM et al., Comparing the Vibrational Properties of Low-Energy Modes of a Molecular and an Atomic Adsorbate: CO and O on Pt(111), Journal of Chemical Physics, Vol. 112, No. 4 (2000)	
	58	GLAVIN et al., Generation of High-Frequency Coherent Acoustic Phonons in a Weakly Coupled Superlattice, Applied Physics Letters, Vol. 74, No. 23 (1999)	
	59	FRIEDMAN, SiGe/Si THz Laser Based on Transitions Between Inverted Mass Light-Hole and Heavy-Hole Subbands, Applied Physics Letters, Vol. 78, No. 4 (2001)	
	60	ERMOSHIN et al., Vibrational Energy Relaxation of Adsorbate Vibrations: A theoretical Study of the H/Si(111) System, J. Chem. Phys. 105 (20) (1996).	
	61	GLAVIN et al., Acoustic Phonon Generation in A Superlattice Under the Hopping Perpendicular Transport, United Nations Educational Scientific and Cultural Organization and International Atomic Energy Agency (1998)	
	62	GERGEN et al., Chemically Induced Electronic Excitations at Metal Surfaces, Science, Vol. 294 (2001).	
	63	HAGSTON et al., Simplified Treatment of Scattering Processes in Quantum Well Structures, Journal of Applied Physics, Vol. 90, No. 3 (2001).	
	64	HARRISON et al., Room Temperature Population Inversion in SiGe TASER designs	
	65	HARRISON et al. The Carrier Dynamics of Terahertz Intersubband Lasers, Some Publishing Company (1999)	
	66	HARRISON et al., Population-Inversion and Gain Estimates for a Semiconductor Taser	
	67	HARRISON et al., Theoretical studies of Subband Carrier Lifetimes in an Optically Pumped Three-Level Terahertz Laser, Superlattices and Microstructures, Vol. 23, No. 2 (1998)	

Examiner  
Signature

Date

Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1725
		Examiner Name	Kiley Stoner
		Attorney Docket Number	22122878-4412
Sheet	13	of	57

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	68	HARRISON et al., The Carrier Dynamics o Far-Infrared Intersubband Lasers and Tunable Emitters, <a href="http://www.ee.leeds.ac.uk/homes/ph/">www.ee.leeds.ac.uk/homes/ph/</a>	
	69	HESS et al., Hot Carrier Relaxation by Extreme Electron-LO Phonon Scattering in GaN	
	70	HOHLFELD et al., Electron and Lattice Dynamics Following Optical Excitation of Metals, Chemical Physics 251, pp. 237-258 (2000)	
	71	HUANG et al., Vibrational Promotion of Electron Transfer, Science, Vol. 290 (2000)	
	72	KAWAKAMI et al., Quantum-well States in Copper Thin Films, Nature, Vol. 398 (1999)	
	73	KOHLER et al., Enhanced Electron-Phonon Coupling at the Mo and W (110) Surfaces Induced by Adsorbed Hydrogen, mtrl-th/9510004 (1995)	
	74	LEWIS et al., Continuum Elastic Theory of Adsorbate Vibrational Relaxation, J. Chem. Phys. 108 (3) (1998)	
	75	LEWIS et al., Controlling Adsorbate Bivational Lifetimes Using Superlattices, Physical Review B, Vol. 63, 085402 (2001)	
	76	KOMIRENKO, Sergiy M., Phonons and Phonon-Related Effects in Prospective Nanoscale Semiconductor Devices (2000)	
	77	HUANG et al., Observation of Vibrational Excitation and Deexcitation for NO(v=2) Scattering from Au(111): Evidence for Electron-Hole-Pair Mediate Energy Transfer, Physical Review Letters, Vol. 84, No. 13 (2000)	
	78	LEWIS et al, Substrate-Adsorbate Coupling in Co-Adsorbed Copper, Physical Review Letters, Vol. 77, No. 26 (1996)	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1448/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 14 of 57

**Complete If Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	79	KRAUSS et al., Coherent Acoustic Phonons in a Semiconductor Quantum Dot, Physical Review Letters, Vol. 79, No. 25 (1997)	
	80	LUGLI et al., Interaction of Electrons with Interface Phonons in GaAs/AlAs and GaAs/AlGaAs Heterostructures, Semicond. Sci. Technol. 7 (1992)	
	81	NIENHAUS et al., Electron-Hole Pair Creation at Ag and Cu Surfaces by Adsorption of Atomic Hydrogen and Deuterium, Physical Review Letters, Vol. 82, No. 2 (1999)	
	82	MULET et al., Nanoscale Radiative Heat Transfer Between a Small Particle and a Plane Surface, Applied Physics Letters, Vol 78, No. 19 (2001)	
	83	NIENHAUS et al., Direct Detection of Electron-Hole Pairs Generated by Chemical Reactions on Metal Surfaces, Surface Science 445, pp. 335-342 (2000)	
	84	NIENHAUS, Hermann, Electronic Excitations by Chemical Reactions on Metal Surfaces, Surface Science Reports 45, pp. 1-78 (2002)	
	85	NOLAN et al., Translational Energy selection of Molecular Precursors to Oxygen Adsorption on Pt(111), Physical Review Letters, Vol. 81, No. 15 (1998)	
	86	NIENHAUS et al., Selective H Atom Sensors Using Ultrathin Ag/Si Schottky Diodes, Applied Physics Letters, Vol. 74, No. 26 (1999)	
	87	NOLAN et al., Molecularly Chemisorbed Intermediates to Oxygen Adsorption on Pt(111): A Molecular Beam and Electron Energy-Loss Spectroscopy Study, Journal of Chemical Physics, Vol. 111, No. 8 (1999)	
	88	NOLAN et al., Direct Verification of a High-Translational-Energy Molecular Precursor to Oxygen Dissociation on Pd(111), Surface Science 419 (1998)	
	89	OGAWA et al., Optical Intersubband Transitions and Femtosecond Dynamics in Ag/Fe(100) Quantum Wells, Physical Review Letters, Vol. 88, No. 11 (2002)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 15 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	90	PLIHAL et al., Role of Intra-Adsorbate Coulomb Correlations in Energy Transfer at Metal Surfaces, Physical Review B, Vol. 58, No. 4 (1998)	
	91	PAGGEL et al., Quantum-Well States as Fabry-Perot Modes in a Thin-Film Electron Interferometer, Science, Vol. 283 (1999)	
	92	PAGGEL et al., Quasiparticle Lifetime in Macroscopically Uniform Ag/Fe(100) Quantum Wells, Physical Review Letters, Vol. 81, No. 25 (1998)	
	93	PAGGEL et al., Quantum Well Photoemission from Atomically Uniform Ag Films: Determination of Electronic Band Structure and Quasi-Particle Lifetime in Ag(100) Applied Surface Science-162-163, pp. 78-85 (2000)	
	94	PERSSON et al., A First-Principles Potential Energy Surface for Eley-Rideal Reaction Dynamics of H Atoms on Cu(111), Journal of Chemical Physics, Vol. 110, No. 4 (1999)	
	95	OZGUR et al., Control of Coherent Acoustic Phonons in InGaN Multiple Quantum Wells, arXiv:cond-mat/0010170 (2000)	
	96	STANTON et al., Energy Relaxation by Hot Electrons in n-GaN Epilayers, Journal of Applied Physics, Vol. 89, No. 2 (2001)	
	97	STIPE et al., Atomistic Studies of O2 Dissociation on Pt(111) Induced by Photons, Electrons and by Heating, J. Chem. Phys. 107 (16) (1997)	
	98	SUN et al., Phonon Pumped SiGe/Si Interminiband Terahertz Laser, pp. 1-11	
	99	SOREF et al., Terahertz Gain in a SiGe/Si Quantum Staircase Utilizing the Heavy-Hole Inverted Effective Mass, Applied Physics Letters, Vol. 79, No. 22 (2001)	
	100	QU et al., Long-Lived Phonons, Physical Review B, Vol. 48, No. 9 (1993)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 16 of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	101	PONTIUS, et al., Size-Dependent Hot-Electron Dynamics in Small Pdn-Clusters, Journal of Chemical Physics, Vol. 115, No. 22 (2001)	
	102	SMIT et al., Enhanced Tunneling Across Nanometer-Scale Metal-Semiconductor Interfaces, Applied Physics Letters, Vol. 80, No. 14 (2002)	
	103	QIU et al., Long-Distance and Damping of Low-Frequency Phonon Polariton in LiNbO <sub>3</sub> , Physical Review B, Vol. 56, No. 10 (1997)	
	104	ROUSSE et al., Non-Thermal Melting in Semiconductors Measured at Femtosecond Resolution, Nature, Vol. 410 (2001)	
	105	SCHELLING et al., Phonon Wave-Packet Dynamics at Semiconductor Interfaces by Molecular-Dynamics Simulation, Applied Physics Letters, Vol. 80, No. 14 (2002)	
	106	SHIKIN et al., Phase Accumulation Model Analysis of Quantum Well Resonances Formed in Ultra-Thin Ag, Au Films on W(110), Surface Science (2001)	
	107	SNOW et al., Ultrathin PtSi Layers Patterned by Scanned Probe Lithography, Applied Physics Letters, Vol. 79, No. 8 (2001)	
	108	PRABHU et al., Femtosecond Energy Relaxation of Nonthermal Electrons Injected in p-doped GaAs Base of a Heterojunction Bipolar Transistor, Journal of Applied Physics, Vol. 90, No. 1 (2001)	
	109	TSAI et al., Theoretical Modeling of Nonequilibrium Optical Phonons and Electron Energy Relaxation in GaN, Journal of Applied Physics, Vol. 85, No. 3 (1999)	
	110	TRIPA et al., Surface-Aligned Photochemistry: Aiming Reactive Oxygen Atoms Along a Single Crystal Surface, Journal of Chemical Physics, Vol. 112, No. 5 (2000)	
	111	TRIPA et al., Surface-Aligned Reaction of Photogenerated Oxygen Atoms with Carbon Monoxide Targets, Nature, Vol. 398 (1999)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 17 of 57

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher city and/or country where published	T <sup>2</sup>
	112	TRIPA et al., Kinetics Measurements of CO Photo-Oxidation on Pt(111), J. Chem. Phys. 105 (4) (1996)	
	113	TAYLOR et al., Strong Electron-LO Phonon Scattering and Hot Carrier Relaxation in GaN, Abstract No. ha249KW3	
	114	SUN et al., Phonon-Pumped Terahertz Gain in n-Type GaAs/AlGaAs Superlattices, Applied Physics Letters, Vol. 78, No. 22 (2001)	
	115	TOM et al., Coherent Phonon and Electron Spectroscopy on Surfaces Using Time-Resolved Second-Harmonic Generation	
	116	TIUSAN et al., Quantum Coherent Transport Versus Diode-Like Effect in Semiconductor-Free Metal/Insulator Structure, Applied Physics Letters, Vol. 79, No. 25 (2001)	
	117	STROMQUIST et al., The Dynamics of H Absorption in and Adsorption on Cu(111), Surface Science 397, pp. 382-394 (1998)	
	118	TRIPA et al., Surface-Aligned Photochemistry: Aiming Reactive Oxygen Atoms Along a Single Crystal Surface, Journal of Chemical Physics, Vol. 112, No. 5 (2000)	
	119	TSAI et al., Theoretical Modeling of Nonequilibrium Optical Phonons and Electron Energy Relaxation in GaN, Journal of Applied Physics, Vol. 85, No. 3 (1999)	
	120	WEBER et al., Carrier Capture Processes in GaAs-AlGaAs Quantum Wells Due to Emission of Confined Phonons, Appl. Phys. Lett. 63 (22) (1993)	
	121	WINTERLIN et al., Atomic and Macroscopic Reaction Rates of a Surface-Catalyzed Reaction, Science, Vol. 278 (1997)	
	122	YEO et al., Calorimetric HEats for CO and Oxygen Adsorption and for the Catalytic CO Oxidation Reaction on Pt(111), J. Chem. Phys. 106 (1) (1997)	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and is not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0551-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 18

of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	123	WITTE et al., Low Frequency Vibrational Modes of Adsorbates, Surface Science, No. 1362 (2002)	
	124	VALDEN et al., Onset of Catalytic Activity of Gold Clusters on Titania with The Appearance of Nonmetallic Properties, Science, Vol. 281 (1998)	
	125	XU et al., Electrical Generation of Terahertz Electromagnetic Pulses by Hot-Electrons in Quantum Wells, Superlattices and Microstructures, Vol. 22, No. 1 (1997)	
	126	WANKE et al., Injectorless Quantum-Cascade Lasers, Applied Physics Letters, Vol. 78, No. 25 (2001)	
	127	ZHDANOV, Vladimir P., Nm-Sized Metal Particles on a Semiconductor Surface, Schottky Model, etc., Surface Science, SUSC 2931 (2002)	
	128	YEO et al., Calorimetric Investigation of NO and O adsorption on Pd(100) and the Influence of Preadsorbed Carbon, J. Chem. Phys. 106 (5) (1997)	
	129	ZAMBELLI et al., Complex Pathways in Dissociative Adsorption of Oxygen on Platinum, Nature, Vol. 390 (1997)	
	130	ZHDANOV et al., Substrate-Mediated Photoinduced Chemical Reactions on Ultrathin Metal Films, Surface Science 432 (1999)	
	131	ALTUKHOV et al., Towards Si1-xGex Quantum-well Resonant-State Terahertz Laser, Applied Physics Letters, Vol. 79, No. 24 (2001)	
	132	FRIEDMAN et al., SiGe/Si THz Laser Based on Transitions Between Inverted Mass Light-Hole and Heavy-Hole Subbands, Applied Physics Letters, Vol. 78, No. 4 (2001)	
	133	HARRISON et al., The Carrier Dynamics of Terahertz Intersubband Lasers, Some Publishing Company (1999)	

Examiner  
SignatureDate  
Considered

<sup>1</sup>EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 19 of 57**OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	134	HARRISON et al., The Carrier Dynamics of Far-Infrared Intersubband Lasers and Tunable Emitters, www.ee.leeds.ac.uk/homes/ph/	
	135	HARRISON et al., Theoretical Studies of Subband Carrier Lifetimes in an Optically Pumped Three-Level Terahertz Laser, Superlattices and Microstructures, Vol. 23, No. 2 (1998)	
	136	HARRISON et al., Room Temperature Population Inversion in SiGe TASER Designs	
	137	HARRISON et al., Population-Inversion and Gain Estimates for a Semiconductor TASER,	
	138	SUN et al., Phonon Pumped SiGe/Si Interminiband Terahertz Laser	
	139	SOREF et al., Terahertz Gain in a SiGe/Si Quantum Staircase Utilizing the Heavy-Hole Inverted Effective Mass, Applied Physics Letters, vol. 79, No. 22 (2001)	
	140	SUN et al., Intersubband Lasing Lifetimes of SiGe/Si and GaAs/AlGaAs Multiple Quantum Well Structures, Appl. Phys. Letter 66 (25) (1995)	
	141	SUN et al., Phonon-Pumped Terahertz Gain in n-Type GaAs/AlGaAs Superlattices, Applied Physics Letters, Vol. 78, No. 22 (2001)	
	142	ALBANO et al., Adsorption-Kinetics of Hot Dimers, SciSearch Database of the Institute for Scientific Information (1999)	
	143	CASASSA et al., Time-Resolved Measurements of Vibrational Relaxation of Molecules on surfaces: Hydroxyl Groups on Silica Surfaces, Journal of Vacuum Science & Technology A: Vacuum, Surfaces, and Films, Vol. 3, Issue 3 (1985)	
	144	CAVANAGH et al., Vibrational Relaxation of Adsorbed Molecules: Comparison with Relaxation Rates of Model Compounds, Journal of Vacuum Science & Technology A: Vacuum, Surfaces and Films, Vol. 5, Issue 4 (1987)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 20 of 57

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	145	HYH et al., Methanol Oxidation of Palladium Compared to Rhodium at Ambient Pressures as Probed by Surface-Enhanced Raman and Mass Spectroscopies, <i>Journal of Catalysis</i> , Vol. 174 (2) (1998)	
	146	GUMHALTER et al., Effect of Electronic Relaxation on Covalent Adsorption Reaction Rates, <i>Physical Review B</i> , Vol. 30, Issue 6 (1984)	
	147	NOLAN et al., Surface Science, Direct Verification of a High-Translational-Energy Molecular Precursor to Oxygen Dissociation on Pd(111), <i>Surface Science</i> , Vol. 419 (1998)	
	148	PHIHAL et al., Role of Intra-Adsorbate Coulomb Correlations in Energy Transfer at Metal Surfaces, <i>Physical Review B</i> , Vol. 58, Issue 4 (1998)	
	149	TULLY et al., Electronic and Phonon Mechanisms of vibrational Relaxation: CO on Cu(100), <i>J. Vac. Sci. Technol. A</i> 11(4) (1993)	
	150	DiMATTEO et al., Enhanced Photogeneration of Carriers in a Semiconductor Via Coupling Across a Nonisothermal Nonascale Vacuum Gap, <i>Applied Physics Letters</i> , Vol. 79, Issue 12 (2001)	
	151	TRIPA et al., Surface-Aligned Photochemistry: Aliming Reactive Oxygen Atoms Along a Single Crystal Surface, <i>The Journal of Chemical Physics</i> , Vol. 112, Issue 5 (2000)	
	152	YATES et al., Special Adsorption and Reaction Effects at Step Defect Sites on Platinum Single Crystal Surfaces (2000)	
	153	DEKORSY et al., Coherent Acoustic Phonons in Semiconductor Superlattices, <i>phys. stat. sp.</i> , (b) 215, p 425-430 (1999)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SE/D&amp;A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449-PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

**Complete If Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet	21	of	57
-------	----	----	----

## U.S. PATENT DOCUMENTS

[illegible]

**FOREIGN PATENT DOCUMENTS**

[illegible]

**Examiner  
Signature**

Date Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**



PTO/SB/DBA (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
 required to respond to a collection of information unless it contains a valid OMB

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**(Use as many sheets as necessary)**

Sheet 22

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

## U.S. PATENT DOCUMENTS

[illegible]

## FOREIGN PATENT DOCUMENTS

[illegible]

**Examiner  
Signature**

Date Considered

\*EX-MINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

**Burdin Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0851-0031  
 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substituted for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>	<b>Complete if Known</b>	
	Application Number	09/631,463
	Filing Date	August 3, 2000
	First Named Inventor	Anthony C. Zuppero
	Art Unit	1725
	Examiner Name	Kiley Stoner
Sheet 23 of 57	Attorney Docket Number	22122878-4412

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner in file <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	7	AUERBACH, Daniel J.; "Hitting the Surface—Softly"; Science, 294, (2001), pp. 2488-2489	
	8	BONDZIE, V. A., et al.; "Oxygen adsorption ... gold particles ... TiO <sub>2</sub> (110)"; J. Vac. Sci. Tech. A., (1999) 17, pp. 1717 and figure 3	
	9	BOULTER, James; "Laboratory Measurement of OH ..."; <a href="http://pearl1.lanl.gov/wsa2002/WSA2002talks.pdf">http://pearl1.lanl.gov/wsa2002/WSA2002talks.pdf</a>	
	10	CHAN H.Y.H., et al.; "Methanol Oxidation On Palladium Compared To Rhodium..."; J. Catalysis v. 174(#2) pp. 191-200 (1998) (abstract and figure 1 only)	
	11	CHIANG, T.-C.; "Photoemission studies of quantum well states in thin films; Surf. Sci. Rpts.39 (2000) pp 181-235	
	12	CHUBB, D. L., et al; "Semiconductor Silicon as a Selective Emitter"; <a href="http://www.thermopv.org/TPV5-2-05-Chubb.pdf">http://www.thermopv.org/TPV5-2-05-Chubb.pdf</a> (abstract only)	
	13	CORCELLI, S. A., et al.; "Vibrational energy pooling in CO on NaCl(100) ..."; J. Chem. Phys.(2002) 116, pp. 8079-8092	
	14	DANESE, A., et al.; "Influence of the substrate electronic structure on metallic quantum well ..."; Prog. Surf. Sci., 67, (2001), pp 249-258	
	15	DAVIS, J. B., et al.; "Kinetics and dynamics of the dissociative chemisorption of oxygen on Ir(111)"; J. Chem. Phys. 107 (3), (1997), pp 943-952	

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0551-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 24 of 57

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>2</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	16	DIEKHONER, L., et al.; "Parallel pathways in methanol... Pt(111)"; Surf. Sci. 409 (1998) pp 384-391	
	17	DIESING, D., et al.; "Aluminum oxide tunnel junctions..."; Thin Solid Films, Vol. 342 (1-2) (1999) pp. 282-290	
	18	DIMATTEO, R. S., et al.; "Enhanced photogeneration of carriers... vacuum gap"; Appl. Phys. Lett. (2001) 79, pp. 1894-1896	
	19	DIMATTEO, R. S., et al.; "Introduction to and Experimental Demonstration of Micron-gap ThermoPhotoVoltaics"; <a href="http://www.thermopv.org/37DiMatteo.html">http://www.thermopv.org/37DiMatteo.html</a> (abstract only)	
	20	DOGWILER, Urs, et al.; "Two-dimensional ... catalytically stabilized ... lean methane-air ..."; Combustion and Flame, (1999), 116(1,2), pp 243-258	
	21	ECHENIQUE, P. M., et al.; "Surface-state electron dynamics in noble metals"; Prog. Surf. Sci., 67, (2001), pp 271-283	
	22	ENDO, Makoto, et al.; "Oxidation of methanol ... on Pt(111) ..."; Surf. Sci. 441 (1999) L931-L937, Surf. Sci. Letters	
	23	FAN, C. Y., et al.; "The oxidation of CO on RuO2 ..."; J. Chem. Phys. 114, (2001), pp. 10058-10062	
	24	FANN, W.S., et al.; "Electron thermalization in gold"; Phys. Rev. B (1992) 46 pp. 13592-13595	

Examiner Signature	Date Considered
-----------------------	--------------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1448/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 25

of 57

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	25	GEE, Adam T., et al.; "The dynamics of O2 adsorption on Pt(533)..."; J. Chem. Phys.(2000) 113, pp. 10333-10343	
	26	GERGEN, Brian, et al.; "Chemically Induced Electronic Excitations at Metal Surfaces"; Science, 294, (2001) pp. 2521-2523	
	27	GULIANTS, Elena A, et al.; "A 0.5-μm-thick polycrystalline silicon Schottky.."; Appl. Phys. Lett., (2002), 80, pp. 1474-1476	
	28	GUMHALTER, B., et al.; "Effect of electronic relaxation ... adsorption reaction rates"; Phys. Rev. B (1984) 30 pp. 3179-3190	
	29	HALONEN, Lauri, et al.; "Reactivity of vibrationally excited methane on nickel..."; J. Chem. Phys.(2001) 115, pp. 5611-5619	
	30	HASEGAWA, Y., et al.; "Modification of electron ... standing wave ... Pd ..."; Surf. Sci., in press, 11 April 2002	
	31	HENRY, Claude R.; "Catalytic activity ... nanometer-sized metal clusters"; Applied Surf. Sci., 164, (2000) pp 252-259	
	32	HESS, S., et al.; "Hot Carrier Relaxation ... Phonon Scattering in GaN"; <a href="http://www.physics.ox.ac.uk/~taylor/images/hot%20carrier%20poster.pdf">http://www.physics.ox.ac.uk/~taylor/images/hot%20carrier%20poster.pdf</a>	
	33	HO, Wilson; <a href="http://www.laspp.cornell.edu/laspp_data/wilsonbo.html">http://www.laspp.cornell.edu/laspp_data/wilsonbo.html</a>	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Approved for use through 10/31/2002. OMB 0861-0031  
 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
 Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB

Substitute for form 1449/PTO

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 26 of 57

## **Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

## **OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Cita No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	34	HOHLFELD, J, et al.; "Electron and lattice dynamics ... optical excitation of metals"; Chemical Physics, 251 (2000) pp 237-258	
	35	HONKALA, Karoliina, et al.; "Ab initio study of O2 precursor states on the Pd(111)..."; J. Chem. Phys. (2001) 115, pp. 2297-2302	
	36	HOU, H. ; Y., et al.; "Chemical Interactions of Super-Excited Molecules on Metal Surfaces"; <a href="http://www2.chem.ucsb.edu/~wodtke/papers/dan1.pdf">http://www2.chem.ucsb.edu/~wodtke/papers/dan1.pdf</a>	
	37	HOU, H., et al.; "Direct multi-quantum relaxation of highly vibrationally excited NO ..."; J. Chem. Phys., 110, (1999) pp 10660 - 10663	
	38	HUANG Y., et al.; "Observation of Vibrational Excitation and Deexcitation for NO from Au(111) ..."; Phys. Rev. Lett., 84, (2000) pp 2985 - 2988	
	39	HUANG, Yuhui, et al.; "Vibrational Promotion of Electron Transfer"; SCIENCE, VOL 290, 6 OCTOBER 2000, pp 111 - 113	
	40	IBH; "NanoLED overview"; <a href="http://www.ibh.co.uk/products/light_sources/nanoled_main.htm">http://www.ibh.co.uk/products/light_sources/nanoled_main.htm</a>	
	41	IBH; "Red picosecond laser sources"; <a href="http://www.ibh.co.uk/products/light_sources/nanoled/heads/red_laser_heads.htm">http://www.ibh.co.uk/products/light_sources/nanoled/heads/red_laser_heads.htm</a>	
	42	IFTIMIA, Ileana, et al.; "Theory ... scattering of molecules from surface"; Phys. Rev. B (2002) 65, Article 125401	

Examiner  
Signature

Date

Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0661-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Klley Stoner
Attorney Docket Number	22122878-4412

Sheet 27 of 57

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

Examiner in file <sup>1</sup>	Cite No. <sup>2</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	43	ISHIKAWA, Yasuyuki, et al.; "Energetics of H <sub>2</sub> O dissociation and COads+OHads reaction .. Pt.."; Surf. Sci. preprints SUSC 12830, 27 April 2002	
	44	JOHNSON, R. Colin; "Molecular substitution ...terahertz switch arrays"; EE Times, (04/10/00, 3:35 p.m. EST) <a href="http://www.eet.com/story/OEG20000410S0057">http://www.eet.com/story/OEG20000410S0057</a>	
	45	KAO, Chia-Ling, et al.; "The adsorption ... molecular carbon dioxide on Pt(111) and Pd(111)"; Surf. Sci., (2001) Article 12570	
	46	KATZ, Gil, et al.; "Non-Adiabatic Charge Transfer Process of Oxygen on metal Surfaces"; Surf. Sci. 425(1) (1999) pp. 1-14	
	47	KAWAKAMI, R. K., et al.; "Quantum-well states in copper thin films"; Nature, 398, (1999) pp 132 - 134	
	48	KOMEDA, T., et al.; "Lateral Hopping of Molecules Induced by Excitation of Internal Vibration..."; Science, 295, (2002) pp 2055-2058	
	49	LEWIS, Steven P., et al.; "Continuum Elastic Theory of Adsorbate Vibrational Relaxation"; J. Chem. Phys. 108, 1157 (1998)	
	50	LEWIS, Steven P., et al.; "Substrate-adsorbate coupling in CO-adsorbed copper"; Phys. Rev. Lett. 77, 5241 (1996)	
	51	LI, Shenping, et al.; "Generation of wavelength-tunable single-mode picosecond pulses ..."; Appl. Phys. Lett. 76, (2000) pp 3676 - 3678	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 28 of 57**Complete If Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	52	MITSUI, T., et al.; "Coadsorption and interactions of O and H on Pd(111)"; Surf. Sci., Article 12767, (2002)	
	53	MOULA, Md. Golam, et al.; "Velocity distribution of desorbing CO2 in CO oxidation on Pd(110)..."; Applied Surf. Sci., 169-170, pp 268-272 (2001)	
	54	MULET, Jean-Philippe, et al.; "Nanoscale radiative heat transfer between a small particle ..."; Appl. Phys. Lett., 78, (2001) p 2931	
	55	NIENHAUS, H, et al.; "Direct detection of electron-hole pairs generated by chemical reactions on metal surfaces"; Surf. Sci. 445 (2000) pp 335- 342	
	56	NIENHAUS, H.; "Electronic excitations by chemical reactions on metal surfaces"; Surf. Sci. Rpts. 45 (2002) pp 1 - 78	
	57	NIENHAUS, H., et al.; "Selective H atom sensors using ultrathin Ag/Si Schottky diodes"; Appl. Phys. Lett. (1999) 74, pp. 4046-4048	
	58	NIENHAUS, Hermann; "Electron-hole pair creation by reactions at metal surfaces"; APS, March 20-26, 1999, Atlanta, GA, Session SC33 [SC33.01]	
	59	NIENHAUS, H, et al.; "Electron-Hole Pair Creation at Ag and Cu ... of Atomic Hydrogen and Deuterium"; Phys. Rev. Lett., 82, (1999) pp. 446-449	
	60	NOLAN P. D., et al.; "Direct verification of... precursor to oxygen dissociation on Pd(111)"; Surf. Sci. v. 419(#1) pp. L107-L113, (1998)	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)	<b>Complete If Known</b>	
	Application Number	09/831,463
	Filing Date	August 3, 2000
	First Named Inventor	Anthony C. Zuppero
	Art Unit	1725
	Examiner Name	Kiley Stoner
Sheet 29 of 57	Attorney Docket Number	22122878-4412

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	61	NOLAN, P. D., et al.; "Molecularly chemisorbed intermediates to oxygen adsorption on Pt ..."; J. Chem. Phys. 111, (1999), pp 3696 - 3704	
	62	NOLAN, P. D., et al.; "Translational ... Precursors to Oxygen Adsorption on Pt(111)"; Phys. Rev. Lett., 81, (1998) pp 3179 - 3182	
	63	OGAWA, S., et al.; "Optical ... and Femtosecond Dynamics in Ag/Fe(100) Quantum Wells"; Phys. Rev. Lett. 88, 116801 (2002)	
	64	PAGGEL, J. J., et al.; "Quantum-Well States as Fabry-Pérot Modes in a ..."; Science, 283, (1999), pp 1709 - 1711	
	65	PAGGEL, J. J., et al.; "Quasiparticle Lifetime ... Ag/Fe(100) Quantum Wells"; Phys. Rev. Lett. (1998) 81, pp. 5632-5635	
	66	PAGGEL, J. J., et al.; "Quantum well photoemission from atomically uniform Ag films ..."; Applied Surf. Sci., 162 -163, (2000), pp 78 -85	
	67	RETTNER, C. T., et al; "Dynamics ... chemisorption of O2 on Pt(111)... chemisorbed precursor..."; J. Chem. Phys. (1991) 94, pp. 1626-1635 (abstract only)	
	68	RINNEMO, Mats; "Catalytic Ignition and Kinetic Phase Transitions"; 1996; <a href="http://www2.lib.chalmers.se/cth/diss/doc/9596/RinnemoMats.html">http://www2.lib.chalmers.se/cth/diss/doc/9596/RinnemoMats.html</a>	
	69	ROBERTSON, A. J. B.; "Catalysis of Gas Reactions by Metals"; Logos Press Limited; 1970; LC # 70-80936; pp. 1-5, 10, 41; Great Britain, Adlard & son Ltd	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comment on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



PTO/SB/08B (10-01)

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/2002. OMB 0651-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 30 of 57

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>2</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	70	SCHEWE, P., et al.; "CO2 Production at the Single-Molecule Level"; <a href="http://www.aip.org/enews/physnews/2001/split/561-1.html">http://www.aip.org/enews/physnews/2001/split/561-1.html</a>	
	71	SHENG, H., et al.; "Schottky diode with Ag on (110) epitaxial ZnO film"; Appl. Phys. Let. (2002) 80, pp. 2132-2134	
	72	SMIT, G. D. J., et al.; "Enhanced tunneling across nanometer-scale metal-semiconductor interfaces"; Appl. Phys. Let.(2002) 80, pp. 2568-2570	
	73	SNOW, E. S., et al.; "Ultrathin PtSi layers patterned by scanned probe lithography"; Appl. Phys. Let. (2001) 79, pp. 1109-1111	
	74	STIPE, B. C., et al.; "Atomistic studies of O2 dissociation on Pt(111) induced by photons ..."; J. Chem. Phys., (1997) 107 pp. 6443-6447	
	75	SUN, C.-K., et al.; "Femtosecond studies of carrier dynamics in InGaN"; Appl. Phys. Let. (1997) 70 pp. 2004-2006	
	76	SVENSSON, K., et al.; "Dipole Active Vibrational Motion in the Physisorption Well"; Phys. Rev. Lett., 78, (1997) pp 2016-2019	
	77	TARVER, Craig M.; "Non-Equilibrium Chemical Kinetic ... Explosive Reactive Flows"; Fall 1999 IMA Workshop: High-Speed Combustion in Gaseous and Condensed-Phase	
	78	TAYLOR, R.A., et al.; "Strong Electron-LO Phonon Scattering and Hot Carrier Relaxation in GaN"; <a href="http://www.physics.ox.ac.uk/rtaylor/images/ha249kw3.pdf">http://www.physics.ox.ac.uk/rtaylor/images/ha249kw3.pdf</a>	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0831-0031

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1725
		Examiner Name	Kiley Stoner
Sheet 31 of 57	Attorney Docket Number	22122878-4412	

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issu number(s), publisher, city and/or country where published	T <sup>2</sup>
	79	TEODORESCU, C.M., et al.; "Structure of Fe layers grown on InAs ..."; Appl. Surf. Sci., 166, (2000) pp 137-142	
	80	TIUSAN, C., et al.; "Quantum coherent transport versus diode-like effect in ..."; Appl. Phys. Lett. 79, (2001) pp 4231-4233	
	81	TRIPA, C. Emil, et al.; "Surface-aligned photochemistry: Aiming reactive oxygen atoms..."; J. Chem. Phys., (2000) 112 pp. 2463-2469	
	82	TRIPA, C. Emil, et al.; "Surface-aligned reaction of photogenerated oxygen atoms with ..."; Nature 398, pp 591 - 593 (1999)	
	83	TRIPA, C. Emil; "Special Adsorption and Reaction Effects at Step Defect Sites on Platinum ..."; <a href="http://www.chem.pitt.edu/thesis.html#tripa">http://www.chem.pitt.edu/thesis.html#tripa</a> (abstract only)	
	84	VOLKENING, S., et al.; "CO oxidation on Pt(111)—Scanning tunneling microscopy experiments ..."; J. Chem. Phys. (2001) 114, pp. 6382-6395	
	85	WATSON, D.T.P., et al.; "Isothermal and temperature-programmed oxidation of CH over Pt..."; Surf. Sci. preprint, year 2001	
	86	WATSON, D.T.P., et al.; "Surface products of the dissociative adsorption of methane on Pt ..."; Surf. Sci. preprint, c. October 2001	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/BB/08B (10-01)  
 Approved for use through 10/31/2002. OMB 0651-0031  
 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
 Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB  
 control number.

Substitute for form 1449/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1725
		Examiner Name	Kiley Stoner
		Attorney Docket Number	22122878-4412
Sheet	32	of	57

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issu number(s), publisher, city and/or country where published	T <sup>2</sup>
	87	WILKE, Steffen, et al.; "Theoretical investigation of water formation on Rh and Pt Surfaces"; J. Chem. Phys., 112, (2000) PP 9986 - 9995	
	88	WINTERLIN, J, et al; "Atomic ...Reaction Rates ... Surface-Catalyzed ..."; Science, 278, (1997) pp. 1931 - 1934	
	89	WINTERLIN, J, R., et al.; "Existence of a "Hot" Atom Mechanism for the Dissociation of O2 on Pt(111)"; Phys. Rev. Lett., 77, (1996), pp 123 - 126	
	90	ZAMBELLI, T., et al.; "Complex pathways in dissociative adsorption of oxygen on platinum"; Nature 390, pp 495 - 497 (1997)	
	91	ZHDANOV, V.P., et al.; "Substrate-mediated photoinduced chemical reactions on ultrathin metal films"; Surf. Sci., V. 432 (#3) pp L599-L603, (1999)	
	92	ZHDANOV, Vladimir P.; "Nm-sized metal particles on a semiconductor surface, Schottky ..."; Surf. Sci. PROOF SUSC 2931, 20 April 2002	
	93	ZHUKOV, V. P., et al.; "Lifetimes of quasiparticle excitations in 4d transition metals ..."; Phys. Rev. B (2002) 65, Article 115116	

Examiner Signature	Date Considered
-----------------------	--------------------

\*EXAMINEE: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box → ☐

PTO/SB/08B (10-98)

Approved for use through 10/31/99. OMB 0851-0031

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1725
		Examiner Name	Kiley Stoner
Sheet 33 of 57	Attorney Docket Number	22122878-4412	

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	1	DANIEL J. AUERBACH, Hitting the Surface Softly, www.sciencemag.org, Vol 294 Science, December 21, 2001, pp. 2488-2489.	
	2	M.D CUMMINGS AND A.Y ELEZZABI, Ultrafast impulsive excitation of coherent longitudinal acoustic phonon oscillations in highly photoexcited InSb, 2001 American Institute of Physics, Volume 79, Number 6, August 6, 2001.	
	3	J.W. GADZUK, Resonance-Assisted Hot Electron Femtochemistry at Surfaces, National Institute of Standards and Technology, Gaithersburg, Maryland 20899, Physical Review Letters, Volume 76, Number 22, May 27, 1996.	
	4	BRIAN GERGEN, HERMAN NIENHAUS, W., HENRY WEINBERG, ERIC W. McFARLAND, Chemically Induced Electronic Excitations at Metal Surfaces, www.sciencemag.org, Vol 294, December 21, 2001, Pgs 2521-2523.	
	5	H.HOU, Y.HUANG, S.J. GUILDING, C.T RETTNER, D.J. AUERBACH, A.M. WOODTKE, Enhanced Reactivity of Highly Vibrationally Excited Molecules on Metal Surfaces, www.sciencemag.org, Vol 284, June 4, 1999, pgs. 1647-1650	
	6	Y.HUANG, C.T RETTNER, D.J. AUERBACH, A.M. WOODTKE, Vibrational Promotion of Electron Transfer, sciencemag.org, Vol 290, October 6, 2000, pgs.111-114.	
	7	STEVEN P. LEWIS, ANDREW M. RAPPE, Controlling adsorbate vibrational lifetimes using superlattices, 2001 The American Physical Society, Physical Review B, Volume 63, 085402.	
	8	HENRY WEINBERG, ERIC W. McFARLAND, A. MAJUNDAR, B. GERGEN, HERMAN NIENHAUS, W.H.S BERGH, Electron-Hole Pair Creation at Al and Cu Surfaces by Adsorption of Atomic Hydrogen and Deuterium, 1999 The American Physical Society, Physical Review Letters, Volume 82,	
	9	HENRY WEINBERG, ERIC W. McFARLAND, A. MAJUNDAR, B. GERGEN, HERMAN NIENHAUS, W.H.S BERGH, Direct detection of electron-hole pairs generated by chemical reactions on metal surfaces, 2000 Elsevier Science B.V., Surface Science, pgs. 335-342.	
	10	XIAOFENG, FAN, GEHONG, CHRIS LABOUNTY, AND BOWERS, JOHN E., CROKE, EDWARD, AHN, CHANNING C., HUXTABLE, SCOTT, MAJUMDAR, ARUN, SHAKOURI, ALI; SiGe/Si superlattice microcoolers; Applied Physics Letters, Volume 78, Number 11, 12 March 2001, Pg: 1580-1582.	
	11	FRIEDMAN, L., SUN G., SOREFF, R.A.; SiGe/Si THz laser based on transitions between inverted mass light-hole and heavy-hole subbands; Applied Physics Letters, Volume 78, Number 4, 22 January 2001; Pg: 401-403.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/088 (10-01)

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/2002. OMB 0851-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 34 of 57**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>2</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	12	HARRISON, P., SOREF, R.A.; Population-inversion and gain estimates for semiconductor TASER.	
	13	HARRISON, P., SOREF, R.A.; Room temperature population inversion in SiGe TASER design.	
	14	HOHLFELD, J., WELLERSHOFF, S.-S, J., GUDDE, U., CONRAD, V., JAHNKE, E., MATTIAS; Electron and lattice dynamics following optical excitation of metals; Chemical Physics 251(2000). Pg: 237-258.	
	15	HOU, H., HUANG, Y., GOULDING, S.J., RETTER, C.T., AUERBACH, D.J., WODRKE, A.M.; Direct multiquantum relaxation of highly vibrationally excited NO in collisions with O/Cu(111); Journal of Chemical Physics; Volume 110, Number 22, 8 June 1999; Pgs: 10957-10963.	
	16	JONGMA, RIENK T., WODTKE, ALEC M.; Fast multiquantum vibrational relaxation of highly vibrationally excited O2; Journal of Chemical Physics; Volume 111, Number 24; 22 December 1999; Pgs: 10957-10963.	
	17	KAWAKAMI, R.K., ROTENBERG, E., CHOI, HYUK J., ESCORCIA-APARICIO, ERNESTO J., BOWEN, M.O., WOLFE, J.H., ARENHOLZ, E., ZHANG, Z.D., SMITH, N.V., QIU, Z.Q.; Quantum-well states in copper thin films; Letters to nature; Volume 398; 11 March 1999; www.nature.com.	
	18	MD. GOLAM MOULA, SURGIO WAKO, GENGYU CAO, IVAN KOBAL, YUICHI OHNO, TATSUO MATSUSHIMA; Velocity distribution of desorbed CO2 in CO oxidation on Pd(110) under steady-state conditions; applied surface science; 169-170 (2001); Pgs: 268-272.	
	19	JEAN-PHILIPPE MULET, KARL JOULAIN, REMI CARMINATI, AND JEAN- JACQUES GREFFET; Nanoscale radiative heat transfer between a small particle and a plane surface; Applied Physics Letters; Volume 78, Number 19; 7 May 2001; Pgs: 2931-2933.	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden for our Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)	<b>Complete If Known</b>	
	Application Number	09/631,463
	Filing Date	August 3, 2000
	First Named Inventor	Anthony C. Zuppero
	Art Unit	1725
	Examiner Name	Kiley Stoner
Sheet 35 of 57	Attorney Docket Number	22122878-4412

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	20	H. NIEHAUS et al., "Direct detection of electron-hole pairs generated by chemical reaction on metal surfaces", Surface Science 445 (2000), Pages 3350342.	
	21	H. NIEHAUS et al., "Selective H atom sensors using ultrathin Ag/Si Schottky diodes", Applied Physics Letters, Volume 74, Number 26, 28 June 1999, Pages 4046-4048.	
	22	J.J. PAGGEL et al., "Quantum-Well States as a Fabry-Perot Modes in a Thin-Film Electron Interferometer", www.Sciencemag.org Science Vol 284 12 March 1999, Pages 1709-1711.	
	23	J.J. PAGGEL et al., "Quasiparticle Lifetime in Macroscopically Uniform Ag/Fe(100) Quantum Wells", Physical Review Letters, Volume 81, Number 25, 21 December 1998, Pages 5632-5635.	
	24	J.J. PAGGEL et al., "Quantum well photoemission from atomically uniform Ag films: determination of electronic band structure and quasi particle lifetime in Ag(100), Applied Surface Science 162-163(2000), Pages 78-85.	
	25	N. PONTIUS et al., "Size-dependent hot-electron dynamics in small Pd <sub>n</sub> -cluster", Journal of Chemical Physics, Volume 115, Number 22, 8 December 2001, Pages 10479-10483.	
	26	R.A. SOREL et al., "Terahertz gain in a SiGe/Si quantum staircase utilizing the heavy-hole inverted effective mass, Applied Physics Letters, Volume 79, Number 22, 26 November 2001, Pages 3639-3641.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/BB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

## Complete If Known

Application Number	09/831,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 36 of 57

## OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	27	G. SUN et al., "Phonon-pumped terahertz gain in n-type GaAs/AlGaAs Superlattices, Applied Physics Letters, Volume 78, Number 22, Pages 3520-3522.	
	28	V. P. ZHDANOV et al., "Substrate-mediated photoinduced chemical reactions on ultrathin metal films", Surface Science 432 (1999), Pages L599-L603.	
	29	H. PARK et al., "Nanomechanical oscillations in a single-C60 transistor", Letters to nature, Volume 407, September 7, 2000, www.nature.com, Pages 57-60.	
	30	G. SUN et al., "Phonon Pumped SiGe/Si Interminiband Terahertz Laser", Pages 1-11.	
	31	G. SUN et al., "Phonon-pumped terahertz gain in n-type GaAs/Al GaAs superlattices", Applied Physics Letters, Volume 78, Number 22, 28 May 2001, Pages 3520-3522.	
	32	K. SVENSSON et al., "Dipole Active Vibrational Motion in the Physisorption Well", Physical Review Letters, Volume 78, Number 10, 10 March 1997, Pages 2016-2019.	
	33	R. D. VALE et al., "The Way Things Move: Looking Under the Hood of Molecular Motor Proteins", Science, Volume 288, 7 April 2000, www.sciencemag.org, Pages 88-95.	
	34	W. XU et al., "Electrical generation of terahertz electromagnetic pulses by hot-electrons in quantum wells, Superlattices and Microstructures, Volume 22, November 1, 1997, Pages 25-29.	
	35	G. SUN, R.A. Soref, J.B. KHURGIN; "Phonon Pumped SiGe/Si Interminiband Terahertz Laser"	

Examiner  
Signature

Date  
Considered

<sup>1</sup>EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 608. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>2</sup> Applicant's unique citation designation number (optional). <sup>3</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

Sheet 57

of 57

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	36	P. ARMOUR et al., "Hot-electron transmission through metal-metal interfaces: a study of Au/Fe/Au trilayers in GaAs substrates", Applied Surface Science 123/124 (1998), Pages 412-417.	
	37	C.D. BEZANT et al., "Intersubband relaxation lifetimes in p-GaAs/AlGaAs quantum wells below the LO-phonon energy measured in a free electron laser experiment", Vacuum Solutions Online, Semicond. Sci. Technol. 14 No. 8 (August 1999) L25-L28, PII: S0268-1242(99)03669-X.	
	38	L. BURGI et al., "Confinement of Surface State Electrons in Fabry-Perot Resonators", Physical Review Letters, Volume 81, Number 24, 14 December 1998, Pages 5370-5373.	
	39	I. CAMPILLO et al., "Inelastic lifetimes of hot electrons in real metals", Physical Review Letters, Volume 83, Number 11, September 13, 1999, Pages 2230-2233.	
	40	CHIANG, T.-C., "Photoemission studies of quantum well states in thin films", Surface Science Reports 39 (2000) pp 181-235	
✓	41	DE PAULA, A. et al, "Carrier capture processes in semiconductor superlattices due to emission of confined phonons", J. Appl. Phys. 77 (12), 1995 pp 6306-6312.	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burdur Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.







Please type a plus sign (+) inside this box → ☐

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/2002. OMB 0651-0031  
U. S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1725
		Examiner Name	Kiley Stoner
Sheet <u>40</u> of <u>57</u>		Attorney Docket Number	22122878-4412

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	1	REE, J. et al., "Dynamics of Gas-Surface Interactions: Reaction of Atomic Oxygen with Chemisorbed Hydrogen on TUNGSTEN," Journal of Physical Chemistry, Vol. 101 (#25), pp. 4523 - 4534, June 19, 1997.	
	2	REE, J. et al., "Reaction of atomic oxygen with adsorbed carbon monoxide on a platinum surface," Journal of Chemical Physics, Vol. 104, Issue 2, pp. 742 - 757, January 8, 1996.	
	3	NOLAN, P.D. et al., "Molecularly chemisorbed intermediates to oxygen adsorption on Pt(111): A molecular beam and electron energy-loss spectroscopy study," Journal of Chemical Physics, Vol. 111, No. 8, pp. 3696 - 3704, August 22, 1999.	
	4	NOLAN, P. D. et al., "Translation Energy Selection of Molecular Precursors to Oxygen Adsorption on Pt (111)," Physical Review Letters, Vol. 81, No. 15, pp. 3179 - 3182, October 12, 1998.	
	5	MURPHY, M. J. et al., "Inverted vibrational distributions from N <sub>2</sub> recombination at Ru(001): Evidence for a metastable molecular chemisorption well," Journal of Chemical Physics, Vol. 110, No. 14, pp. 6954 - 6962, April 8, 1999.	
	6	KIM, M. S. et al., "Reaction of Gas-Phase Atomic Hydrogen with Chemisorbed Hydrogen Atoms on an Iron Surface," Bull. Korean Chem. Soc., Vol. 18, No. 9, pp. 985 - 994, May 22, 1997.	
	7	BONN, M. et al., "Phonon-Versus Electron-Mediated Desorption and Oxidation of CO on Ru(0001)," Science, Vol. 285, pp. 1042 - 1045, August 13, 1999. www.sciencemag.org	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U. S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box → ☐

Approved for use through 10/31/2002. OMB 0551-0031  
 U. S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
 Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1726
		Examiner Name	Kiley Stoner
		Attorney Docket Number	22122878-4412
Sheet	41	of	57

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	8	NOLAN, P. D. et al., "Direct verification of a high-translational-energy molecular precursor to oxygen dissociation on Pd(111)," Surface Science Letters, Vol. 419, pp. L107 - L113, September 24, 1998.	
	9	DAVIS, J. E. et al., "Kinetics and dynamics of the dissociative chemisorption of oxygen on Ir(111)," Journal of Chem. Phys., Vol. 107(3), pp. 943 - 952, July 15, 1997.	
	10	TRIPA, C. Emil et al., "Surface-aligned reaction of photo-generated oxygen atoms with carbon monoxide targets," Nature, Vol. 398, pp. 591 - 593, April 15, 1999, www.nature.com.	
	11	SHIN HK, "Vibrationally excited OD Radicals from the Reaction of Oxygen-Atoms with Chemisorbed Deuterium on TUNGSTEN," Journals of Physical Chemistry, Vol. 102(#13), pp. 2372 - 2380, March 26, 1998.	
	12	TRIPA, C. Emil et al., "Kinetics measurements of CO photo-oxidation on Pt(111)," Journal of Chemical Physics, Vol. 105, Issue 4, pp. 1691 - 1696, July 22, 1996.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U. S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type :+ plus sign (+) inside this



PTC/SB/08A (1D-963)

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	42	of	57
-------	----	----	----

**Complete If Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

## U.S. PATENT DOCUMENTS

[illegible]

## FOREIGN PATENT DOCUMENTS

[illegible]

**Examiner  
Signature**

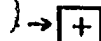
Date  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> See attached Kinds of U.S. Patent Documents. <sup>3</sup> Enter Office that issued the document, by the two-letter code (W PO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language translation is attached.

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**

Please type a plus sign (+) inside the



PTO/SB/088 (10-86)  
Approved for use through 10/31/99. OMB 0651-003-1  
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
Collection of Information unless it contains a valid OMB control number.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1448/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		<b>Complete If Known</b> Application Number 09/631,463 Filing Date August 3, 2000 First Named Inventor Anthony C. Zuppero Art Unit 1725 Examiner Name Kiley Stoner Attorney Docket Number 22122878-4412	
Sheet	43	of	57

[illegible]

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**















Please type a plus sign (+) inside this box → ☐

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/99. OMB 0681-0031  
Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1726
		Examiner Name	Kiley Stoner
Sheet <input checked="" type="checkbox"/> 50 of <input type="checkbox"/> 57		Attorney Docket Number	22122878-4412

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	Y <sup>2</sup>
	1.	FRESE, et al., "Analysis of Current/Voltage Curves at n-Si/SiO <sub>2</sub> /Pt Electrodes", J. Electrochem. Soc., December 1994, pp. 3375-3382, Vol. 141, No. 12, The Electrochemical Society, Inc.	
	2.	FRESE, et al., "Methanol Oxidation at p-Si/Pt Electrodes, Evidence for Hot Hole Reactivity", J. Phys. Chem., 1995, pp. 6074-6083, Vol. 99, American Chemical Society.	
	3.	GADZUK, "Multiple Electron Processes in Hot-Electron Femtochemistry at Surfaces", <a href="http://www.cstl.nist.gov/div837/837.03/highlite/gadzuk1999.htm">http://www.cstl.nist.gov/div837/837.03/highlite/gadzuk1999.htm</a> .	
	4.	FRESE, et al., "Hot Electron Reduction at Etched n-Si/Pt Thin Film Electrodes", J. Electrochem. Soc., September 1994, pp.2402-2409, Vol. 103, The Electrochemical Society Inc.	
	5.	GAILLARD, et al., "Hot Electron Generation in Aqueous Solution at Oxide-Covered Tantalum Electrodes, Reduction of Methylpyridinium and Electrogenenerated Chemiluminescence of Ru(bpy) <sub>3</sub> <sup>2+</sup> ", J. Phys. Chem., 1999, pp.667-674, Vol. 103, American Chemical Society.	
	6.	SUNG, et al., "Demonstration of Electrochemical Generation of Solution-Phase Hot Electrons at Oxide-Covered Tantalum Electrodes by Direct Electrogenenerated Chemiluminescence", J. Phys. Chem., 1998, pp. 9797-9805, Vol. 102, American Chemical Society.	
	7.	ZHDANOV, et al., "Substrate-mediated photoinduced chemical reactions on ultrathin metal films", Surface Science, 1999, pp. L599-L603, Vol. 432, Elsevier Science B.V.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08A (10-01)

Approved for use through 10/31/2002 OMB 0551-0001

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 51

of 57

**Complete If Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppero
Art Unit	1725
Examiner Name	Klley Stoner
Attorney Docket Number	22122878-4412

**U.S. PATENT DOCUMENTS**

[illegible]

**FOREIGN PATENT DOCUMENTS**

[illegible]

**Examiner  
Signature**

Date Considered

\*EXAM NER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

**Burden** 4our Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the Individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**

PTO/SB/068 (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Standard form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>	<b>Complete if Known</b>	
	Application Number	09/631,463
	Filing Date	August 3, 2000
	First Named Inventor	Anthony C. Zuppero
	Art Unit	1725
	Examiner Name	Kiley Stoner
	Attorney Docket Number	22122878-4412

Sheet 52 of 57

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	5	ACHERMANN, M. et al., "Carrier dynamics around nano-scale Schottky contacts: a femtosecond near-field study", Applied Surface Science 7659 (2002) 1-4.	
	6	AESCHLIMANN, M. et al., "Competing nonradiative channels for hot electron induced surface photochemistry", Chemical Physics, April 15, 1996, pp. 127-141, Vol: 205, Issue: 1-2.	
	7	AESCHLIMANN, M. et al., "Ultrafast electron dynamics in metals", The Ultrafast Surface Science Group, <a href="http://www.ilp.physik.uni-essen.de/aeschlimann/2y_photo.htm">http://www.ilp.physik.uni-essen.de/aeschlimann/2y_photo.htm</a>	
	8	AUERBACH, D. et al., "Reagent Vibrational Excitation: A Key to Understanding Chemical Dynamics at Surfaces?", abstract only.	
	9	BALANDIN, A. et al., "Significant decrease of the lattice thermal conductivity due to phonon confinement in a free-standing semiconductor quantum well", Physical Review B, July 15, 1998, Vol. 58, Issue 3, pp. 1545-1549.	
	10	BALANDIN, A. et al., "Effect of phonon confinement on the thermoelectric figure of merit of quantum wells", Journal of Applied Physics, December 1, 1998, Vol. 84, Issue 11, pp. 6149-6153	
	11	BONN, M. et al., "Phonon- Versus Electron-Mediated Desorption and Oxidation of CO on Ru(0001)", Science, Vol. 285, Number 5430, Issue of 13 Aug 1999, pp. 1042 - 1045	
	12	CHANG, Y. et al., "Coherent phonon spectroscopy of GaAs surfaces using time-resolved second-harmonic generation", Chemical Physics, 251/1-3, pages 283-308, (2000)	
	13	CHEN, -C. et al., "Hot electron reduction at n-Si/Au thin film electrodes", Journal-of-the-Electrochemical-Society, Vol. 139, November 1992, pages 3243-3249.	
	14	CHOI, C.K. et al., "Ultrafast carrier dynamics in a highly excited GaN epilayer", Physical Review B, Vol. 63, 115315, 15 March 2001, 6 pages.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINEE: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington DC 20231.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/2002. OMB 0651-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1725
		Examiner Name	Kiley Stoner
		Attorney Docket Number	22122878-4412
Sheet <u>53</u> of <u>57</u>			

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	Y <sup>2</sup>
	15	DEBERNARDI, A. et al., "Anharmonic Phonon Lifetimes in Semiconductors from Density-Functional Perturbation Theory", Physical Review Letters, VOL. 75, NUMBER 9, 28 AUGUST 1995, pp 1819 - 1822.	
	16	DELFATTI, N. et al., "Temperature-dependent electron-lattice thermalization in GaAs", Physical Review B, 15 FEBRUARY 1999-I, Vol. 59, Number 7, pp 4576 - 4579.	
	17	DENZLER, D.N., et al., "Surface femtochemistry: Ultrafast reaction dynamics driven by hot electron mediated reaction pathways", Femtochemistry and Femtobiology: Ultrafast Dynamics in Molecular Science. (World Scientific. 2002).	
	18	DIESING, D. et al., "Surface reactions with hot electrons and hot holes in metals", Surface Science, 331-333, 1995, pages 289 - 293.	
	19	DRISKILL-SMITH, A. A. G. et al., "The "nanotriode." A nanoscale field-emission tube", Applied Physics Letters, November 1, 1999, Vol. 75, Issue 18, pp. 2845-2847.	
	20	FAN, C. Y. et al., "The oxidation of CO on RuO <sub>2</sub> - TiO <sub>2</sub> - at room temperature", Journal of Chemical Physics, Vol. 114, Number 22, 8 June 2001, P 10058.	
	21	FRESE, K.W., Jr. et al., "Hot electron reduction at etched n-Si/Pt thin film electrodes", Journal-of-the-Electrochemical-Society, Vol. 141, September 1994, pages 2402-9.	
	22	FUNK, S. et al., "Desorption of CO from Ru - 001 - induced by near-infrared femtosecond laser pulses", Journal of Chemical Physics, Vol. 112, Number 22, 8 June 2000, pages 9888 - 9897.	
	23	GADZUK, J. W., "Resonance-assisted hot electron femtochemistry at surfaces", Physical Review Letters, May 27, 1996, Vol. 76, Issue 22, pages 4234-4237.	
	24	GADZUK, J. W., "Multiple Electron Processes in Hot-Electron Femtochemistry at Surfaces", <a href="http://www.cstl.nist.gov/div837/837.03/highlite/gadzuk1999.htm">http://www.cstl.nist.gov/div837/837.03/highlite/gadzuk1999.htm</a>	
	25	GADZUK, J. W., "Surface Femtochemistry with Fast Lasers and Slow Nanostructures", <a href="http://www.cstl.nist.gov/div837/837.03/highlite/previous/dietmim.htm">http://www.cstl.nist.gov/div837/837.03/highlite/previous/dietmim.htm</a>	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/2002. OMB 0651-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number	09/631,463
		Filing Date	August 3, 2000
		First Named Inventor	Anthony C. Zuppero
		Art Unit	1726
		Examiner Name	Kiley Stoner
Sheet 54 of 57	Attorney Docket Number	22122878-4412	

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	26	GAILLARD, F. et al., "Hot electron generation in aqueous solution at oxide-covered tantalum electrodes. Reduction of methylpyridinium and electrogenerated chemiluminescence of Ru(bpy)32+", <i>Journal of Physical Chemistry B</i> , Vol. 103, No. 4, January 28, 1999, pages 667-74.	
	27	GAO, S., "Quantum kinetic theory of vibrational heating and bond breaking by hot electrons", <i>Physical Review B</i> , Vol. 55, No. 3, 15 January 1997-I, pages 1876-1886.	
	28	GERGEN, B. et al., "Chemically Induced Electronic Excitations at Metal Surfaces", <i>Science</i> , Vol. 294, Number 5551, Issue of 21 December 2001, pages 2521-2523.	
	29	GUO, J. et al., "The desorption yield dependence on wavelength of femtosecond laser from CO/Cu(111)", Annual Meeting of the American Physical Society, March 1999, Atlanta, GA;	
		Session BC18 - Surfaces (General), ORAL session, March 21; Room 258W, GWCC [BC18.06]	
	30	HESS, S. et al., "Hot Carrier Relaxation by Extreme Electron - LO Phonon Scattering in GaN", <a href="http://www.physics.ox.ac.uk/rtaylor/images/hot%20carrier%20poster.pdf">http://www.physics.ox.ac.uk/rtaylor/images/hot%20carrier%20poster.pdf</a>	
	31	HOFER, U., "Self-Trapping of Electrons at Surfaces", <i>Science</i> , Vol. 279, Number 5348, Issue of 9 January 1998, pages 190 - 191.	
	32	KATZ, G. et al., "A theoretical study of hole induced desorption", <i>Journal of Chemical Physics</i> , October 22, 1999, Vol. 111, Issue 16, pages 7593-7598.	
	33	LEE, B. C. et al., "Transmission of longitudinal optical phonons through a barrier in uniaxial crystals", <i>Physical Review B</i> , Vol. 65, 153315, 15 April 2002.	
	34	NANOLITE, "NANOLITE Sparkflashlamp", <a href="http://www.hsps.com/products/nanolaen.htm">http://www.hsps.com/products/nanolaen.htm</a>	
	35	NIENHAUS, H., "Electronic excitations by chemical reactions on metal surfaces", <i>Surface Science Reports</i> , 45, (2002), pages 1 - 78.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Approved for use through 10/31/2002. OMB 0651-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitution for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		<b>Complete if Known</b> Application Number 09/631,463 Filing Date August 3, 2000 First Named Inventor Anthony C. Zuppero Art Unit 1725 Examiner Name Kiley Stoner Attorney Docket Number 22122878-4412	
Sheet	55	of	57

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	36	PLIHAL, M. et al., "Role of intra-adsorbate Coulomb correlations in energy transfer at metal surfaces", Physical Review B, July 15, 1998, Vol. 58, Issue 4, pages 2191-2206.	
	37	PONTIUS, N. et al., "Size-dependent hot-electron dynamics in small Pd-clusters", Journal of Chemical Physics, December 8, 2001, Vol. 115, Issue 22, pages 10479-10483.	
	38	PRYBYLA, J. A. et al., "Femtosecond time-resolved surface reaction: Desorption of CO from Cu(111) in < 325 fsec", Physical Review Letters, January 27, 1992, Vol. 68, Issue 4, pp. 503-506.	
	39	RINNEMO, M., "Catalytic Ignition and Kinetic Phase Transitions", <a href="http://www2.lib.chalmers.se/cth/diss/doc/9596/RinnemoMats.html">http://www2.lib.chalmers.se/cth/diss/doc/9596/RinnemoMats.html</a>	
	40	SAALFRANK, P. et al., "Quantum dynamics of bond breaking in a dissipative environment: Indirect and direct photodesorption of neutrals from metals", J. Chem. Phys. 105 (6), 8 August 1996, pages 2441 - 2454.	
	41	SUNG, Y.-E., et al., "Enhancement of electrochemical hot electron injection into electrolyte solutions at oxide-covered tantalum electrodes by thin platinum films", Journal of Physical Chemistry B., Vol. 102, No. 49, December 3, 1998, pages 9806-11.	
	42	WHITE, J. M., "Using photons and electrons to drive surface chemical reactions", Journal of Molecular Catalysis A: Chemical 131, 1998, pages 71-90.	
	43	ZHDANOV, V.P. et al., "Substrate-mediated photoinduced chemical reactions on ultrathin metal films", Surface Science, Vol. 432 (#3), pages L599-L603, Jul 20, 1999.	
	44	ZHU, X.-Y., "Surface photochemistry: from hot reactions to hot materials", Surface Science, Vol. 390, (1997), pages 224-236.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/08B (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**(Use as many sheets as necessary)**

Sheet 56

of 57

**Complete If Known**

Application Number	09/631,463
Filing Date	August 3, 2000
First Named Inventor	Anthony C. Zuppers
Art Unit	1725
Examiner Name	Kiley Stoner
Attorney Docket Number	22122878-4412

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

[illegible]

**Examiner  
Signature**

Date  
Considered

\*EXAMINER Initial If reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

**1** Applicant's unique citation designation number (optional). **2** Applicant is to place a check mark here if English language Translation is attached. **Burden Hour Statement:** This form is estimated to take 20 hours to complete. **Fee:** \$100.00. **Comments:** \_\_\_\_\_

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.**



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**